

Curriculum Vita

SARAH F. HAMM-ALVAREZ

Gavin S. Herbert Professor of Pharmaceutical Sciences
Professor of Physiology and Biophysics and Ophthalmology
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University of Southern California

PERSONAL INFORMATION:

Business Address: John Stauffer Pharmaceutical Sciences Center
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ACADEMIC BACKGROUND

1982-1986 B. A. (Chemistry, with Distinction), Carleton College, Northfield MN
1986-1990 Ph. D. (Biochemistry, minor in Toxicology), Duke University, Durham NC

PROFESSIONAL EXPERIENCE

1990-1993 Postdoctoral Fellow, Dept. of Cell Biology, Duke University
1993-1999 Assistant Professor, Department of Pharmaceutical Sciences, University of Southern California (USC)
1993- Member, Norris Comprehensive Cancer Center
1995- Member, USC Center for Liver Diseases
1995-1999 Assistant Professor, Department of Physiology and Biophysics (secondary), USC
1999-2005 Associate Professor, Departments. of Pharmaceutical Sciences and Physiology and Biophysics
1998- 2006 Director, Confocal Microscopy Subcore, USC Center for Liver Diseases
2001-2005 Associate Professor, Department of Ophthalmology (secondary), USC
2005- Professor of Pharmaceutical Sciences, Physiology and Biophysics and Ophthalmology, USC
2006 Interim Chair, Department of Pharmaceutical Sciences, USC
2006- Cell Biology Ancillary Core Director, USC Center for Liver Diseases
2006- Chair, Department of Pharmacology and Pharmaceutical Sciences

HONORS

1991-1993 Postdoctoral Research Fellow, Muscular Dystrophy Association
1994-1996 Initial Investigatorship, American Heart Association-Greater Los Angeles Affiliate
2000-2004 John A. Biles Professor of Pharmaceutical Sciences, USC
2003- Doctor of Philosophy, *honoris causa*, University of Kalmar, Sweden
2004- Gavin S. Herbert Professor of Pharmaceutical Sciences, USC

RESEARCH INTERESTS

Cytoskeleton and membrane trafficking; epithelial cell biology; signal transduction; viral trafficking; lacrimal gland; tear film and ocular surface, dry eye and Sjögren's syndrome; drug targeting and intracellular drug delivery

PUBLICATIONS

Primary Research Articles—Peer Reviewed

1. Johnson JL, **Hamm-Alvarez S**, Payne G, Sancar GB, Rajagopalan KV, and Sancar A. Identification of the second chromophore of Escherichia coli and yeast DNA photolyases as 5,10-methenyltetrahydrofolate. *Proc Natl Acad Sci USA*. 85: 2046-2050, 1988.
2. **Hamm-Alvarez S**, Sancar A, and Rajagopalan KV. The role of the enzyme-bound 5,10-methenyltetrahydropteroylpolyglutamate in catalysis by Escherichia coli DNA photolyase. *J Biol Chem* 264: 9649-9656, 1989.
3. **Hamm-Alvarez S**, Sancar A, and Rajagopalan KV. The presence and distribution of reduced folates in Escherichia coli dihydrofolate reductase mutants. *J Biol Chem* 265: 9850-9856, 1990.
4. **Hamm-Alvarez S**, Sancar A, and Rajagopalan KV. A novel catalytic folate: studies on the folate cofactor of Escherichia coli DNA photolyase. *J Biol Chem* 265: 18656-18662, 1990.
5. **Hamm-Alvarez SF**, Kim PY, and Sheetz MP. Regulation of microtubule-dependent vesicle transport in CV-1 cells and extracts. *J Cell Sci* 106: 955-966, 1993.
6. **Hamm-Alvarez SF**, Alayof B, Himmel H, Kim PY, Crews AL, Strauss HC, and Sheetz MP. Coordinate depression of bradykinin receptor recycling and microtubule-dependent transport by taxol. *Proc Natl Acad Sci USA* 91: 7812-7816, 1994.
7. McIlvain JM, Burkhardt JK, **Hamm-Alvarez S**, Argon Y, and Sheetz MP. Regulation of kinesin activity by phosphorylation of kinesin-associated proteins. *J Biol Chem* 269: 19176-19182, 1994.
8. **Hamm-Alvarez SF**, Sonee M, Loran-Goss K, and Shen W. Paclitaxel and nocodazole differentially alter endocytosis in CV-1 cells. *Pharm Res* 13:1645-1654, 1996.
9. **Hamm-Alvarez SF**, Wei X, Berndt N and Runnegar MT. Protein phosphatases independently regulate vesicle transport and microtubule subpopulations in hepatocytes. *Am J Physiol (Cell Physiol)* 271: C929-942, 1996.
10. Sussman M, **Hamm-Alvarez SF**, Vilalta P and Kedes L. Involvement of phosphorylation in doxorubicin-mediated myofibril degeneration: an immunofluorescence microscopy analysis. *Circ Res* 80: 52-51, 1997.
11. **Hamm-Alvarez SF**, da Costa S, Yang T, Wei, X-H, Gierow P, and Mircheff AK. Cholinergic stimulation of lacrimal acinar cells promotes redistribution of membrane-

- associated kinesin and the secretory protein, β -hexosaminidase, and increases kinesin motor activity. *Exp Eye Res* **64**:141-156, 1997.
12. Runnegar M, Wei X, Berndt N and **Hamm-Alvarez SF**. Transferrin receptor recycling in hepatocytes is regulated by protein phosphatase 2A, possibly through effects on microtubule-dependent transport. *Hepatology* **26**:176-185, 1997.
 13. da Costa, SR, Yarber, FA, Zhang, L, Sonee, M and **Hamm-Alvarez, SF**. Microtubules facilitate the stimulated secretion of beta-hexosaminidase in lacrimal acinar cells. *J Cell Sci* **111**: 1267-1276, 1998.
 14. Vilalta P, Zhang L and **Hamm-Alvarez SF**. A novel taxol-induced vimentin phosphorylation revealed by studies on stable microtubule and vimentin intermediate filaments. *J Cell Sci* **111**: 1841-1852, 1998.
 15. Bolger MB, Haworth IS, Yeung AK, Ann DK, von Grafenstein H, **Hamm-Alvarez SF**, Okamoto CT, Kim K-J, Basu SK, Wu SK and Lee VHL. Structure, function, and molecular modeling approaches to the study of the intestinal dipeptide transporter PepT1. *J Pharm Sci* **11**:1286-1291, 1998.
 16. Sonee M, Barron E, Yarber FA and **Hamm-Alvarez SF**. Taxol inhibits endosomal/lysosomal membrane trafficking at two distinct steps in CV-1 cells. *Am J Physiol* **275**:C1630-1639, 1998.
 17. Yeung AK, Basu SK, Wu SK, Chu C, Ann DK, Haworth IS, Bolger MB, **Hamm-Alvarez SF**, Okamoto CT, von Grafenstein H, Shen W-C, Kim K-J and Lee, VHL. Tyrosine 167 in the human intestinal proton-coupled dipeptide transporter (hPepT1) is essential for glycyl sarcosine uptake. *Biochem Biophys Res Comm* **250**:103-107, 1998.
 18. Runnegar M, Wei X and **Hamm-Alvarez SF**. Increased protein phosphorylation of cytoplasmic dynein results in impaired motor function. *Biochem J* **346**:1-6, 1999.
 19. Lee VHL, Chu C, Mahlin ED, Basu SK, Ann DK, Bolger MB, Haworth IS, Yeung AK, Wu SK, **Hamm-Alvarez SF** and Okamoto CT. Biopharmaceutics of transmucosal peptide and protein drug administration: role of transport mechanisms with a focus on the involvement of PepT1. *J Control Release* **62**:1299-140, 1999.
 20. Zhang L, da Costa S, Yarber FA, Sonee M, Runnegar M and **Hamm-Alvarez SF**. Protein phosphatase inhibitors alter cellular microtubules and reduce carbachol-dependent protein secretion in lacrimal acini. *Curr Eye Res* **20**:373-383, 2000.
 21. da Costa S, Wang Y, Vilalta P, Schonthal A and **Hamm-Alvarez SF**. Changes in cytoskeletal organization in polyoma middle T antigen-transformed fibroblasts: involvement of protein phosphatase 2A and *src* tyrosine kinases. *Cell Motil Cytoskel* **47**: 253-268, 2000.
 22. Wang Y, Wei X, Duncan R, Ann D and **Hamm-Alvarez SF**. Identification of a novel taxol-sensitive kinase activity associated with the cytoskeleton. *Biochem Biophys Res Comm* **277**: 525-530, 2000.
 23. Lindberg J, Fernandez M, Ropp D and **Hamm-Alvarez SF**. Nocodazole treatment of CV-1 cells enhances nuclear/perinuclear accumulation of lipid-DNA complexes and increases gene expression. *Pharm Res* **18**: 246-249, 2001.

24. **Hamm-Alvarez SF**, Chang A, Wang Y, Jerdeva G, Kim K-J and Ann DK. Etk/Bmx Activation Modulates Barrier Function in Epithelial Cells. *Am J Physiol (Cell Physiol)* **280**: C1657-1668, 2001.
25. Qian L, Yang T, Chen H, Xie J, Zeng H, Warren DW, MacVeigh M, Meneray MA, **Hamm-Alvarez SF** and Mircheff AK. Heterotrimeric GTP-binding proteins in the lacrimal acinar cell endomembrane system. *Exp Eye Res* **74**: 7-22, 2002.
26. Yang L, Leong PKK, Chen J, Lubman RL, **Hamm-Alvarez SF** and McDonough AA. Acute hypertension provokes internalization without inhibition of proximal tubule NHE3. *Am J Physiol (Renal Physiol)* **282**:F730-F740, 2002.
27. Wang Y, Jerdeva G, Yarber FA, da Costa SR, Xie J, Qian L, Rose CM, Mazurek C, Kasahara, N, Mircheff AK and **Hamm-Alvarez SF**. Cytoplasmic dynein participates in apically-targeted stimulated secretory traffic in primary rabbit lacrimal acinar epithelial cells. *J Cell Sci* **116**: 2051-2065, 2003.
28. da Costa SR, Sou E, Yarber FA, Okamoto CT, Pidgeon M, Kessels MM, Mircheff AK, Schechter J, Qualmann B and **Hamm-Alvarez SF**. Impairing actin filament or syndapin functions promotes accumulation of clathrin-coated vesicles at the apical plasma membrane of polarized cells. *Mol Biol Cell* **14**:4397-4413, 2003.
29. **Hamm-Alvarez SF**, Xie J, Wang Y and Medina-Kauwe LK. Modulation of secretory functions in epithelia by adenovirus capsid proteins. *J Control Rel* **93**: 129-140, 2003.
30. Qian L, Wang W, Xie J, Rose CM, Yang T, Nakamura T, Sandberg M, Zeng H, Schechter JE, Chow RH-P, **Hamm-Alvarez SF** and Mircheff AK. Biochemical changes contributing to functional quiescence in lacrimal gland acinar cells after chronic ex vivo exposure to a muscarinic agonist. *Scand J Immunol* **58**:550-565, 2003.
31. Xie J, Qian L, Wang Y, Yang T, **Hamm-Alvarez SF** and Mircheff AK. A novel biphasic traffic of EGF to recycling and degradative compartments in lacrimal acinar cells is independent of EGFR degradation. *J Cell Physiol* **199**:108-125, 2004.
32. Xie J, Qian L, Wang Y, **Hamm-Alvarez SF** and Mircheff AK. Role of the microtubular cytoskeleton in traffic of EGF through the lacrimal acinar cell endomembrane network. *Exp Eye Res* **78**:1093-1106, 2004.
33. Wang Y, Xie J, Yarber FA, Mazurek C, Trousdale M, Medina-Kauwe L, Kasahara N and **Hamm-Alvarez SF**. The adenoviral capsid modulates secretory compartment organization and function in acinar epithelial cells from rabbit lacrimal gland. *Gene Ther* **11**: 970-981, 2004.
34. Qian L, Xie T, Rose CM, Sou E, Zeng H, **Hamm-Alvarez SF** and Mircheff AK. Altered traffic to the lysosome in an ex vivo model of chronic muscarinic receptor stimulation. *Exp Eye Res* **79**:665-675, 2004.
35. Chu C, Okamoto O, **Hamm-Alvarez SF** and Lee VHL. Stable transfection of MDCK cells with epitope-tagged human PepT1. *Pharm Res* **21**:1970-1973, 2004.
36. Rose CM, Qian L, Hakim L, Wang Y, Jerdeva GY, Marchelletta R, Nakamura T, **Hamm-Alvarez SF** and Mircheff AK. Accumulation of catalytically active cathepsins in lacrimal

gland acinar cell endosomes during chronic *ex vivo* muscarinic receptor stimulation. *Scand J Immunol* **61**:36-50, 2005.

37. Rentsendorj A, Agadjanian H, Chen X, Ciravello M, MacVeigh M, Kedes L, **Hamm-Alvarez SF** and Medina-Kauwe LK. The Ad5 fiber mediates non-viral gene transfer in the absence of the whole virus, utilizing a novel cell entry pathway. *Gene Ther* **12**: 225-237, 2005.
38. Jerdeva G, Yarber FA, Trousdale MD, Rhodes CJ, Okamoto CT, Dartt DA and **Hamm-Alvarez SF**. Dominant negative PKC ϵ impairs apical actin remodeling in parallel with inhibition of carbachol-stimulated secretion in rabbit lacrimal acini. *Am J Physiol (Cell Physiol)* **289**:C1052-C1068, 2005.
39. Jerdeva G, Wu K, Yarber FA, Rhodes CJ, Kalman D, Schechter JE and **Hamm-Alvarez SF**. Actin and non-muscle myosin II facilitate apical exocytosis of tear proteins in rabbit lacrimal acinar epithelial cells. *J Cell Sci* **118**:4797-4812, 2005.
40. da Costa SR, Wu, K., MacVeigh M, Pidgeon M, Ding C, Schechter JE and **Hamm-Alvarez SF**. Male NOD mouse lacrimal glands exhibit profound age-related changes in the exocytotic pathway early in postnatal development. *Exp Eye Res* **82**:33-45, 2006.
41. Ding C, MacVeigh M, Pidgeon M, da Costa SR, Wu K, **Hamm-Alvarez SF** and Schechter JE. Unique ultrastructure of lacrimal glands in NOD and BALB/c mice. *Curr Eye Res* **31**:13-22, 2006.
42. Andersson SV, **Hamm-Alvarez SF** and Gierow JP. Integrin adhesion in regulation of lacrimal gland acinar cell secretion. *Exp Eye Res* **83**:543-553, 2006.
43. Rentsendorj A, Xie J, MacVeigh M, Agadjanian H, **Hamm-Alvarez SF** and Medina-Kauwe LK. Typical and atypical trafficking pathways of Ad5 penton base recombinant protein: implications for gene transfer. *Gene Ther*, in press.

Primary Research Articles--In Revision or Submitted for Peer Review:

44. Chu C, Okamoto CT, Uchiyama T, Haworth IS, **Hamm-Alvarez SF** and Lee VHL. PMA induced a PepT1 isoform with accelerated mobility in SDS-PAGE. Manuscript submitted.
45. Xie J, Chiang L, Contreras J, Wu K, Medina-Kauwe L and **Hamm-Alvarez SF**. A novel fiber-dependent entry mechanisms for Ad5 in lacrimal acini. Manuscript in revision.
46. Norouziyan F, **Hamm-Alvarez, SF** and Shen WC. Tyrphostin 8A stimulates a novel trafficking pathway of apically-endocytosed transferrin through rab11-enriched compartments in Caco-2 cells. Manuscript submitted.
47. Schenke-Layland K, Xie J, Hagvall SH, Konig K, Angelis E, **Hamm-Alvarez SF**, Stock UA, Brockbank KGM and Maclellan WR. Effects of cryopreservation techniques on extracellular matrix damage in cardiac tissues: implications for graft durability. Manuscript submitted.

Reviews and Chapters

48. **Hamm-Alvarez, SF**. Microtubule-dependent motor proteins: new targets for drug delivery? *Pharm Res* **13**: 489-496, 1996. (peer-reviewed)
49. **Hamm-Alvarez SF**. Molecular motors and their role in membrane traffic. *Adv Drug Deliv Rev* **29**: 229-242, 1998. (peer-reviewed)

50. **Hamm-Alvarez SF** and Sheetz MP. Microtubule-dependent vesicle transport: modulation of channel and transporter activity in liver and kidney. *Physiol Rev* 78:1109-1129, 1998. (peer reviewed)
51. **Hamm-Alvarez SF**, da Costa SR, Sonee M, Warren DW and Mircheff AK. Kinesin activation drives the retrieval of secretory membranes following secretion in rabbit lacrimal acinar cells. *Lacrimal Gland, Tear Film, and Dry Eye Syndromes 2: Basic Science and Clinical Relevance. Adv Exp Med Biol* 438:177-180, 1998.
52. Mircheff AK, Gierow JP, Yang T, **Hamm-Alvarez SF**, Zhang J, Wood RL, Azzarolo AM, Warren DW, Zeng H, Okamoto CT, Guo Z, Kaslow HR and Bachmann M. Sjögren's autoimmunity: how perturbation of recognition in endomembrane traffic may provoke pathological recognition at the cell surface. *J Molec Recog* 11: 40-48, 1998.
53. **Hamm-Alvarez SF**. Targeting endocytosis and motor proteins to enhance DNA persistence. *Pharm Sci Tech* 2:190-196, 1999. (peer-reviewed)
54. **Hamm-Alvarez, SF**. Focus on "EGF receptor downregulation depends on trafficking motif in distal tyrosine kinase domain". *Am J Physiol (Cell Physiol)* 282:C417-C419, 2002.
55. Mircheff AK, Xie J, Qian L and **Hamm-Alvarez SF**. Diverse perturbations may alter the lacrimal acinar cell autoantigenic spectra. *DNA and Cell Biol* 21:435-42, 2002.
56. Mircheff AK, Qian L, Xie J, Wang Y and **Hamm-Alvarez SF**. M3 receptor autoimmunity. Losing tolerance to a familiar protein. *Adv Exper Med Biol.* 506:51-58, 2002.
57. da Costa SR, Andersson S, Yarber FA, Okamoto C and **Hamm-Alvarez SF**. Cytoskeletal participation in stimulated secretion and compensatory apical plasma membrane retrieval in lacrimal gland acinar cells. *Adv Exper Med Biol.* 506:199-206, 2002.
58. Xie J, Quan L, **Hamm-Alvarez SF** and Mircheff AK. Epidermal growth factor traffic in lacrimal acinar cells. *Adv Exper Med Biol* 506:213-218, 2002.
59. da Costa SR, Okamoto CT and **Hamm-Alvarez SF**. Actin filaments et al.: the many components, effectors and regulators of epithelial cell endocytosis. *Adv Drug Deliv Rev* 55:1359-1383, 2003. (peer-reviewed)
60. Mircheff, AK, **Hamm-Alvarez SF**, Schechter JE, Trousdale MD, Kaslow, HR, Azzarolo AM and Warren DW. Lacrimal epithelial cell – lymphocyte interactions. The endocrine system and the ocular surface modulate the conversation. *Epithelial Cell Biology: Implications for the Ocular Surface*. S.C. Yiu, ed. Doheny Eye Institute, Los Angeles, 20 – 26, 2003.
61. **Hamm-Alvarez SF**, Mircheff AK, Wang Y, Jerdeva G, da Costa S and Schechter J. Molecular mechanisms of apical secretion and retrieval in lacrimal acinar epithelia, *Epithelial Cell Biology: Implications for the Ocular Surface*. S.C. Yiu, ed. Doheny Eye Institute, Los Angeles, 27 - 29, 2003.
62. **Hamm-Alvarez SF** and Okamoto CT. Endocytosis and sorting of macromolecules: Preface. *Adv Drug Deliv Rev* 55: 1351-1352, 2003.
63. Mircheff AK, Wang Y, de Saint Jean M, Ding C, Trousdale MD, **Hamm-Alvarez SF** and Schechter JE. Mucosal Immunity and Self-Tolerance in the Ocular Surface System. *The Ocular Surface* 3:182-193, 2005. (peer-reviewed)

64. Mircheff AK, **Hamm-Alvarez SF**, Kaslow HR, Schechter JE and Trousdale MD. Epithelial cells in lymphocyte regulation in the lacrimal gland. In Immunology of the Ocular Surface and the Lacrimal Gland, in press.
65. Medina-Kauwe LK, Xie J and **Hamm-Alvarez SF**. Intracellular trafficking of non-viral vectors. *Gene Ther* 12:1734-1751, 2005 (peer-reviewed).
66. Mircheff AK, Wang Y, de St Jean M, Ding C, Trousdale MD, **Hamm-Alvarez SF** and Schechter JE. Mucosal Immunity and Self-Tolerance in the Ocular Surface System. *4*:182-193, 2005.
67. Wu K, da Costa SR, Jerdeva G, Sou E, Schechter J and **Hamm-Alvarez SF**. Mechanisms of exocytosis in lacrimal gland. *Exp Eye Res* 83: 84-96, 2006 (peer-reviewed).
68. Selvam S, Thomas PB, **Hamm-Alvarez, SF**, Schechter JE, Stevenson D, Mircheff AK and Trousdale MD. Current status of gene delivery and gene therapy in lacrimal gland using viral vectors. *Adv Drug Deliv Rev*, submitted (peer-reviewed).
69. **Hamm-Alvarez SF** and Mircheff AK. The Inner Lives of Lacrimal Acinar Secretory Cells: A Moving Story. *The Ocular Surface*. Manuscript in preparation.

Edited Volumes:

Co-editor, with Curtis Okamoto, *Advanced Drug Delivery Reviews* issue entitled “Endocytosis and Sorting of Macromolecules”, vol 55 (11), 2003.

GRANT SUPPORT

Active:

1. “Microtubule-based transport in lacrimal gland function”; NIH 5 RO1 EY011386-10; **Sarah F. Hamm-Alvarez, PI**; 30% effort; \$1,075,000; (current year \$225,000); April 1, 2004-March 31, 2009.
2. “Ad5 fiber entry and intracellular trafficking in lacrimal acini”; NIH ROI EY017293-01; **Sarah F. Hamm-Alvarez, PI**; 25% effort; \$1,175,000 (current year \$250,000); April 1, 2006-March 31-2011.
3. “pIgR trafficking in lacrimal gland”; NIH RO1 EY016985-01; **Sarah F. Hamm-Alvarez, PI**; 15% effort, \$975,000 (current year \$175,000); August 1, 2006-July 31, 2011.
4. “Basal-lateral endomembrane traffic in lacrimal acini”; NIH 5 RO1 EY005081-21; Austin Mircheff, PI (**Sarah F. Hamm-Alvarez, coinvestigator**); 5% effort; October 1, 2004-September 30, 2009.
5. “Regulation of sodium transport in the kidney”; NIH 5 RO1 DK034316-19; Alicia McDonough, PI (**Sarah F. Hamm-Alvarez, coinvestigator**); 2% effort; April 1, 2004-March 31, 2009.
6. “Lacrimal acinar secretory vesicle biogenesis and release”, Ruth L. Kirschstein National Research Service Award, NIH 1 F31 EY015928; Ron Marchelletta (**Sarah F. Hamm-Alvarez, sponsor**); \$84, 176; July 1 2004-June 30, 2007.

Pending:

1. "Confocal Microscopy Imaging System"; S10 RR022508-A1; Murad Ookhtens, PI (**Sarah F. Hamm-Alvarez, co-I**); \$500,000; April 1, 2006-March 31, 2007.

Previously held:

1. "Effect of taxol on membrane trafficking"; American Cancer Society Institutional Research Grant/USC Norris Cancer Center; \$14,300; **Sarah F. Hamm-Alvarez, PI**; Jan 1993-Dec 1993.
2. "CFTR and its effect on microtubule-dependent vesicle transport", Medical Faculty Women's Association/USC, \$1960, **Sarah F. Hamm-Alvarez, PI**; April 1993-March 1994.
3. "A novel mechanism for reversing taxol's inhibition of microtubule-dependent vesicle transport"; American Association of Colleges of Pharmacy; \$7500; **Sarah F. Hamm-Alvarez, PI**; Dec 1993-May 1995.
4. "The effect of microtubule accumulation on membrane trafficking in cardiac cells"; American Heart Association, Greater Los Angeles Affiliate Initial Investigatorship and Grant-in-aid awards; **Sarah F. Hamm-Alvarez, PI**; \$51,000 (Initial Investigatorship) and \$59,556 (Grant-in-Aid); July 1994-June 1996.
5. "Tear Gland Fluid Formation"; NIH ORWH Supplement to EY-05081; Austin K. Mircheff, PI (**Sarah F. Hamm-Alvarez, co-PI**); \$39,815; Oct 1994-Sept 1995.
6. "Regulation of microtubule-dependent vesicle transport by microcystin-LR in hepatocytes"; Pilot project award from the USC Center for Liver Diseases (P30 DK48522); \$24,557; **Sarah F. Hamm-Alvarez, PI**; March 1995-Feb 1996).
7. "Regulation of microtubule-dependent vesicle transport by microcystin-LR in hepatocytes"; Pilot project award from USC Center for Liver Diseases (P30 DK48522); \$24,000; **Sarah F. Hamm-Alvarez, PI**; March 1996-Feb 1997.
8. "Biochemical correlates for pathological response to paclitaxel"; California Breast Cancer Research Program; Silvia Formenti, PI; \$123,071 (**Sarah F. Hamm-Alvarez, coinvestigator**); June 1, 1997-May 31, 1998.
9. "Cellular mechanisms of taxol toxicity"; NIH R29 CA63387; **Sarah F. Hamm-Alvarez, PI**; \$350,000; April 1, 1994-May 15, 1999.
10. "Vesicle transport regulation in intoxication and disease"; NIH RO1 DK56040; Maria Runnegar, PI (**Sarah F. Hamm-Alvarez, coinvestigator**); \$795,364; September 1, 1999-August 31, 2004.
11. "Mechanisms of taxol/estramustine phosphate action in prostate cancer"; USC Norris Translational Pilot Project; **Sarah F. Hamm-Alvarez** and Heinz Josef Lenz, **co-PIs**; \$20,000; December 1, 1999-November 30, 2000.
12. "Minority Predoctoral Fellowship", NIH 5 F31 EY 07037; Silvia da Costa, graduate student (**Sarah F. Hamm-Alvarez, sponsor**); \$70,000; January 1, 2000-December 31, 2002.
13. "Mechanisms of HSV-1 Transport in CNS Neurons"; NIH RO1 NS38246; Judy Garner, PI (**Sarah F. Hamm-Alvarez, coinvestigator**); July 1, 2000-June 30, 2004.
14. "PepT1: Structure-function, sorting and modulation"; NIH RO1 GM59297; Vincent Lee, PI (**Sarah F. Hamm-Alvarez, coinvestigator**) 3% effort; March 1, 2000-Feb 28, 2005.

15. "Adenovirus modulation of lacrimal acinar function"; NIH 5 RO3 EY013949; **Sarah F. Hamm-Alvarez, PI**; 15% effort; \$300,000; April 1, 2003-March 31, 2006.
16. Digestive Diseases Core Center"; NIH P30 DK048522; Neil Kaplowitz, PI (**Sarah F. Hamm-Alvarez, Confocal Microscopy Sub-Core director**); 5% effort; March 1, 1998-March 31, 2006.
17. "Molecular hierarchies in salivary adaptive responses"; NIH 5 RO1 DE014183-05; David Ann, PI (**Sarah F. Hamm-Alvarez, coinvestigator**) 8% effort; July 1, 2001-April 30, 2006.

ABSTRACTS (USC ONLY)

1. Rodriguez MR and **Hamm-Alvarez S**. Measurement of intracellular vesicle transport using video microscopy. *Pharm Res* 11:255, 1994.
2. **Hamm-Alvarez SF**, Prieto J, Gierow JP, Tang T, Bekmezian A, Walker RA and Mircheff AK. Kinesin is localized to endosomal and secretory membranes in acinar cells. *Mol Biol Cell* 5:31a, 1994.
3. **Gierow JP, Tang T, Bekmezian A, Rafisolyman S, Hamm-Alvarez SF**, Wood RL and Mircheff AK. Major endosomal pool of Na,K-ATPase in rabbit lacrimal gland acinar cells. *Mol Biol Cell* 5:195a, 1994.
4. **Hamm-Alvarez SF**, da Costa SR, Gierow JP, Yang T and Mircheff AK. Soluble and membrane-bound kinesin in lacrimal acinar cells. *IOVS* 36:S990, 1995.
5. **Hamm-Alvarez SF**, Wei X-H, Berndt N and Runnegar M. Protein phosphatase 2A-mediated effects on microtubule-dependent vesicle transport and receptor-mediated endocytosis in hepatocytes. *Hepatology* 22:308A, 1995.
6. Sonee M, Loran-Goss K, Shen W-C and **Hamm-Alvarez SF**. Effect of microtubule-targeted drugs on transferring receptor accumulation in CV-1 cells. *Mol Biol Cell* 6:293a, 1995.
7. **Hamm-Alvarez SF**, Wei-X-H, Berndt N and Runnegar M. Protein phosphatases 1 and 2A regulate interphase microtubule distribution in hepatocytes. *Mol Biol Cell* 6:159a, 1995.
8. da Costa SR, Tang T, Mircheff AK and **Hamm-Alvarez SF**. Microtubule organization in reconstituted lacrimal gland acini. *IOVS* 37:S857, 1996.
9. **Hamm-Alvarez SF**, da Costa SR and Yarber F. Changes in microtubule assembly do not alter the cytokeratin network in lacrimal acini. *Invest Ophthal Vis Sci* 38:S156, 1997.
10. Yeung AK, Ann D, Bolger MB, von Grafenstein H, **Hamm-Alvarez SF**, Shen WC, Okamoto CT, Kim KY, Basu SJ, Haworth IS and Lee VHL. Expression of dipeptide transporter PepT1 in NIH3T3 cells for structure-function studies. *Pharm Res* 13:S243, 1996.
11. **Hamm-Alvarez SF**, da Costa SR, Sonee M, Warren DW and Mircheff AK. Kinesin activation drives the retrieval of secretory membranes following secretion in rabbit lacrimal acinar cells. 2nd International Conference on the Lacrimal Gland, Tear Film, and Dry Eye Syndromes: Basic Science and Clinical Relevance, Bermuda, 1996.
12. **Hamm-Alvarez SF**, Wei X, Berndt N and Runnegar M. Regulation of endocytic processing by protein phosphatase 2A in hepatocytes. AASLD, 1996.
13. da Costa SR, Mircheff AK, Warren DW and **Hamm-Alvarez SF**. Stimulation of secretion is not associated with cytoskeletal disassembly. *Mol Biol Cell* 7:613a, 1996.

14. Sonee M, Mircheff AK and **Hamm-Alvarez SF**. Taxol alters endocytic membrane traffic in CV-1 cells. *Mol Biol Cell* 7:452a, 1996.
15. Vilalta PM, Runnegar M and **Hamm-Alvarez SF**. Taxol modifies the effects of a protein phosphatase inhibitor on the microtubule organization in CV-1 cells. *Mol Biol Cell* 7:575a, 1996.
16. Hamm-Alvarez SF, Wei X and Runnegar M. Inhibition of protein phosphatase 2A leads to enhanced phosphorylation of kinesin and cytoplasmic dynein and decreased microtubule-based vesicle motility in intact hepatocytes. AASLC conference on “Vesicle-based transport through hepatic epithelium”, Airlie VA, June 1997.
17. da Costa SR, **Hamm-Alvarez SF** and Yarber R. Protein phosphatase inhibitors cause microtubule and cytokeratin intermediate filament disassembly in lacrimal acini. *IOVS* 38:S157, 1997.
18. Vilalta P and **Hamm-Alvarez SF**. Taxol induces phosphorylation and stabilization of vimentin intermediate filaments. *Pharm Res* 14:S110, 1997.
19. Yeung AK, Ann DK, Bolger MB, Haworth IS, **Hamm-Alvarez SF**, Okamoto CT, Shen WC, von Grafenstein HV, Basu SK, Wu S and Lee BHL. Functional analysis of human dipeptide transporter (hPepT1) by site-directed mutagenesis. *Pharm Res* 14:S154, 1997.
20. Sonee M, Barron E, Yarber F and **Hamm-Alvarez S**. Taxol inhibits cytoplasmic dynein-driven vesicular traffic from endosomes to lysosomes in CV-1 cells. *Pharm Res* 14: S154, 1997.
21. Sonee M, Yarber FA and **Hamm-Alvarez SF**. Kinesin heavy and light chain phosphorylation is correlated with stimulated secretion in rabbit lacrimal acinar cells. *Invest Ophthal Vis Sci* 39:S886, 1998.
22. Runnegar M, Wei X and **Hamm-Alvarez SF**. Phosphorylation of cytoplasmic dynein and associated proteins leads to reduced avidity of endosomal membranes for microtubules. *Hepatology* 28:399A, 1998.
23. Vilalta PM, Wei X, Schönthal A and **Hamm-Alvarez SF**. Polyoma middle T antigen disrupts stable microtubules through a protein phosphatase 2A-dependent mechanism. *Mol Biol Cell* 9:39a, 1998.
24. Sonee M, Yarber FA, Grant T and **Hamm-Alvarez SF**. Kinesin phosphorylation accompanies stimulated secretion in lacrimal acini. *Mol Biol Cell* 9:389a, 1998.
25. **Hamm-Alvarez SF**, Zhang L, da Costa SR and Yarber FA. Protein phosphatase 2A-mediated inhibition of stimulated secretion in lacrimal acini is correlated with changes in microtubules and cytoplasmic dynein. *Mol Biol Cell* 9:202a, 1998.
26. Sonee M, Yarber FA and **Hamm-Alvarez SF**. Supramaximal stimulation of rabbit lacrimal acinar cells alters kinesin phosphorylation and activity. *Invest Ophthal Vis Sci* 40:S964, 1999.
27. da Costa, SR, Sonee M, Yarber FA and **Hamm-Alvarez SF**. A novel secretagogue-sensitive kinesin cross-bridge function in rabbit lacrimal gland acini. *Invest Ophthal Vis Sci* 41:S61, 2000.

28. **Hamm-Alvarez SF**, Sonee MS, da Costa SR and Yarber FA. Kinesin function in lacrimal acinar secretion. International Congress for Eye Research Meetings, Santa Fe NM, October 2000.
29. da Costa SR, Andersson S, Yarber FA, Okamoto CT and **Hamm-Alvarez SF**. Cytoskeletal participation in compensatory apical plasma membrane retrieval following stimulated secretion in lacrimal acinar cells. Third International Conference on the Lacrimal Gland, Tear Film and Dry Eye Syndromes: Basic Science and Clinical Relevance, Maui, November 2000.
30. da Costa SR, Andersson S, Yarber FA, Okamoto CT and **Hamm-Alvarez SF**. Clathrin-mediated endocytosis in the retrieval of apical membrane following secretagogue stimulation in lacrimal gland acinar cells. *Mol Biol Cell*. 11:216a. 2000.
31. **Hamm-Alvarez SF**, Chang A, Wang A, Jerdeva G, Kim K-J and Ann DK. Etk expression in Pa-4 cells increases transepithelial resistance in parallel with altered cellular junctions. *Mol Biol Cell*. 11:296a, 2000.
32. Wang Y, da Costa SR, Vilalta P, Schonthal A and **Hamm-Alvarez SF**. Transformation of fibroblasts with polyoma middle T antigen alters focal adhesions in parallel with changes in src tyrosine kinases. *Mol Biol Cell*. 11:350a, 2000.
33. da Costa SR, Yarber FA, Okamoto CT, Qian L, Xie J, Mircheff AK and **Hamm-Alvarez SF**. Evidence that Clathrin, α -adaptin and dynamin mediate compensatory apical plasma membrane retrieval in lacrimal acinar cells. *IOVS* 42: S259, 2001.
34. Jerdeva GV, Yarber FA and **Hamm-Alvarez SF**. A role for p150/dynactin in the accelerated membrane trafficking triggered by carbachol in the lacrimal gland. *IOVS* 42:S259, 2001.
35. Wang Y, Yarber FA, Mazurek CM, Kasahara N and **Hamm-Alvarez SF**. Adenovirus-mediated overexpression of p50/dynamitin alters basal and stimulated protein secretion in primary rabbit lacrimal acinar cells. *IOVS* 42:S264, 2001.
36. da Costa SR, Yarber FA, Okamoto C, Pigeon M, Schechter J and **Hamm-Alvarez SF**. Apical actin facilitates budding of clathrin-coated vesicles in rabbit lacrimal acinar epithelial cells. FASEB 2002 meetings.
37. Xie J, Qian L, Hamm-Alvarez SF and Mircheff AK. Effect of EGF stimulation on protein sorting in lacrimal gland acini. *IOVS* 43:e-abstract 3112, 2002.
38. da Costa SR, Yarber FA, Kessels M, Qualmann B and **Hamm-Alvarez SF**. A role for syndapin I and II and mammalian Abp1 in clathrin-mediated apical endocytosis in rabbit lacrimal acinar cells. *IOVS* 43: e-abstract 3142, 2002.
39. **Hamm-Alvarez SF**, Wang Y, Mazurek C and Kasahara N. Transduction of rabbit lacrimal acini with replication incompetent adenovirus serotype 5 inhibits exocytosis and transcytosis. *IOVS* 43: e-abstract 3139, 2002.
40. Medina-Kauwe LK, Marchelletta R, MacVeigh M, Chen X, Maguire M, Kedes L and **Hamm-Alvarez SF**. Ad5 capsid protein uptake and trafficking in HeLa cells. *Mol Biol Cell (Suppl)* 13: 541a, 2002.
41. da Costa SR, Yarber FA, Pidgeon M, Kessels MM, Schechter J, Qualmann B and **Hamm-Alvarez SF**. Potential Role of the Syndapin/N-WASP/Arp2/3 Complex Protein Network in Apical Endocytosis in Lacrimal Acini. *Mol Biol Cell (Suppl)* 13: 449a, 2002.

42. Qian L, Rose C, Xie J, Nakamura T, **Hamm-Alvarez SF** and Mircheff AK. Glycolipid-rich membrane microdomains in lacrimal acinar cell endomembrane compartments. IOVS 44: e-abstract 2521, 2003.
43. Xie J, Qian L, **Hamm-Alvarez SF** and Mircheff AK. Actin cytoskeleton may modulate diverse EGF effects on membrane traffic in lacrimal acini. IOVS 44: e-abstract 2530, 2003.
44. Jerdeva G, Yarber FA, da Costa SR and **Hamm-Alvarez SF**. Actin filaments participation in stimulated exocytosis in primary rabbit lacrimal acinar cells. IOVS 44: e-abstract 2518, 2003.
45. Sou E, da Costa SR, Zian L, Rose CM, Mircheff AK and **Hamm-Alvarez SF**. Methyl- β -cyclodextrin impairs apical clathrin-mediated endocytosis in lacrimal acini. IOVS 44: e-abstract 2525, 2003.
46. Marchelletta RR, Wang Y, Qian L, Rose CM, Mircheff AK and **Hamm-Alvarez SF**. Stimulated trafficking of prolactin to the apical plasma membrane in primary rabbit lacrimal acini is facilitated by microtubules and dynein. IOVS 44: e-abstract 3779, 2003.
47. Mircheff AK, Wang Y, Qian L, Rose CM, Nakamura T and **Hamm-Alvarez SF**. Chronic muscarinic receptor stimulation impairs constitutive-, regulated- and recruitable secretory pathways and alters actin microfilament organization in lacrimal acinar cells. IOVS 44: e-abstract 2528, 2003.
48. Jerdeva GV, Yarber FA, Mircheff AK and **Hamm-Alvarez SF**. Association of syncollin with secretory vesicles in primary rabbit lacrimal acinar cells. Mol Biol Cell 14:251a, 2003.
49. da Costa SR, MacVeigh M, Pidgeon M, Schechter J and **Hamm-Alvarez SF**. Mol Biol Cell 14:251a, 2003.
50. Torres AM, Topp KS, Gan J, **Hamm-Alvarez SF** and Garner JA. Interference with the PI3 kinase and other growth regulation pathways may prevent actin microfilament reorganization in HSV-1 infected differentiated PC12 cells. Mol Biol Cell 14:176a, 2003.
51. Wang Y, Nakamura T, Yarber F, Stevenson D, Trousdale M, **Hamm-Alvarez SF** and Mircheff AK. Adenoviral vector-mediated overexpression of prolactin and its effect on the apical secretory pathway in rabbit lacrimal acini. IOVS 45: e-abstract 3876, 2004.
52. Xie J, Medina-Kauwe LK and **Hamm-Alvarez SF**. Novel interactions of adenovirus capsid proteins in primary rabbit lacrimal acini. IOVS 45: e-abstract 3875, 2004.
53. Schechter JE, da Costa SF, MacVeigh M, **Hamm-Alvarez SF** and Ding C. Unique ultrastructure of lacrimal glands of NOD and BALB/c mice. IOVS 45: e-abstract 3870, 2004.
54. Hu J, Jerdeva G, Sou E, Wang Y, Mircheff AK and **Hamm-Alvarez SF**. The distribution and binding partners of kinesin II in rabbit lacrimal acini. IOVS 45: e-abstract 3862, 2004
55. da Costa SR, Pidgeon M, MacVeigh M, Ding C, Schechter JE and **Hamm-Alvarez SF**. Lacrimal acini in NOD mice exhibit profound alterations in mature secretory vesicles. IOVS 45: e-abstract 3857, 2004.
56. Jerdeva GV, Yarber F, Trousdale MD, Dartt DA and **Hamm-Alvarez SF**. PKC ϵ Function in Apical Exocytosis in Rabbit Lacrimal Acinar Cells. IOVS 45: e-abstract 3863, 2004.
57. Rose, CM, Qian L, Hakim L, Nakamura T, **Hamm-Alvarez SF** and Mircheff AK. Endosomal reflux of catalytically active cathepsins during an aberrant membrane trafficking

- program activated by chronic muscarinic stimulation of lacrimal acinar cells. IOVS 45: e-abstract 3869, 2004.
58. Sou E, Yarber F, Rose CM, Chiu CTW, Mircheff AK, Karvar S and **Hamm-Alvarez SF**. Characterization of Soluble NSF Attachment Protein Receptors (SNAREs) in rabbit Lacrimal Gland Acinar Cells. *The Ocular Surface* 3 (Supplement): S115, 2005.
 59. Jerdeva GV, Wu K, Yarber F and **Hamm-Alvarez SF**. Enhanced dynamics of apical actin cytoskeleton facilitate apical exocytosis of tear proteins in rabbit lacrimal acinar epithelial cells. *The Ocular Surface* 3 (Supplement): S76, 2005.
 60. Wang Y, Chiu CTW, Nakamura T, Yarber F, Stevenson D, Trousdale MD, Hamm-Alvarez SF and Mircheff AK. The effect of prolactin overexpression on secretory function in rabbit lacrimal acinar cells. *The Ocular Surface* 3 (Supplement): S125, 2005.
 61. **Hamm-Alvarez SF**. The actin cytoskeleton and its effectors mediate multiple steps in secretory vesicle exocytosis in rabbit lacrimal acinar epithelial cells. *The Ocular Surface* 3 (Supplement): S71, 2005.
 62. Marchelletta RR, Jerdeva G, Qian L, Salas L, Jacobs D, Cheney RE and **Hamm-Alvarez SF**. The novel myosin motor, myosin Vc, facilitates stimulated exocytosis in rabbit lacrimal acinar cells. *The Ocular Surface* 3 (Supplement): S89, 2005.
 63. **Hamm-Alvarez SF**, Medina-Kauwe L and Xie J. The adenoviral capsid penton inhibits lacrimal acinar secretory functions through multiple penton-integrin interactions at the cell surface. *Controlled Release Society Annual Meeting*, June 2005.
 64. Xie J, Rentsendorj A, Agadjanian H, Medina-Kauwe LK and **Hamm-Alvarez SF**. Novel Fiber-Mediated Adenovirus Interactions in Primary Rabbit Lacrimal Acini. *Gene Therapy Annual Meeting*, June 2005.
 65. Marchelletta R, Jacobs D, Cheney R, Garner JA and **Hamm-Alvarez SF**. Myosin Vc and Cytoplasmic Dynein are enriched in membrane compartments in lacrimal acinar epithelial cells. 177, *American Society for Cell Biology Annual Meeting*, Dec 2005.
 66. Zhang W, Jerdeva G, **Hamm-Alvarez SF** and Okamoto CT. Interaction between rab3D and the polymeric immunoglobulin receptor in lacrimal acinar cells. 1184, *American Society for Cell Biology Annual Meeting*, Dec 2005.
 67. Yaghoobian N, Liang C, Xie J, **Hamm-Alvarez SF**, Peng CA, DeMaio L, Borok Z, Crandall ED and Kim KJ. Nanoparticle interactions with and trafficking across lung alveolar epithelium. Plenary lecture at the session "Pulmonary barrier - mucosal barriers", V Ith International Conference and Workshop on Cell Culture and in vitro Models for Drug Absorption and Delivery, Department of Biopharmaceutics and Pharmaceutical Technology, Saarland University, Saarbrücken, Germany, March 6, 2006.
 68. Yaghoobian N, DeMaio L, Liang C, Xie J, **Hamm-Alvarez S**, Peng CA, Borok Z, Crandall ED and Kim, KJ. Nanoparticles can injure and translocate across alveolar epithelial cell monolayers. *FASEB J*. 20: A1439, 2006.
 69. Chiang L, Wu K and **Hamm-Alvarez SF**. Rab 27 isoforms are major players in lacrimal gland intracellular trafficking. Submitted to the Association for Research in Vision and Ophthalmology 2006 Annual Meeting.

70. Wu K, Chen C, Macveigh M, Ding C, Schechter J and **Hamm-Alvarez SF**. ICA69 (-/-) NOD mice exhibit restoration of lacrimal gland endoplasmic reticulum morphology and improvement in ocular surface integrity relative to NOD mice. Submitted to the Association for Research in Vision and Ophthalmology 2006 Annual Meeting.
71. Evans E, Chiang L, Zhang W, Okamoto C and **Hamm-Alvarez SF**. Polymeric IgA receptor trafficking and secretory component secretion in rabbit lacrimal gland acinar cells. Submitted to the Association for Research in Vision and Ophthalmology 2006 Annual Meeting.
72. Zhang W, Jerdeva J, **Hamm-Alvarez SF** and Okamoto CT. Interaction between rab3D and the polymeric immunoglobulin receptor in lacrimal acinar cells. Submitted to the Association for Research in Vision and Ophthalmology 2006 Annual Meeting.
73. Xie J, Stevenson D, Yarber FA, **Hamm-Alvarez SF** and Trousdale MD. Transduced viral IL-10 is exocytosed from lacrimal acinar secretory vesicles in response to carbachol. Submitted to the Association for Research in Vision and Ophthalmology 2006 Annual Meeting.
74. Chen C, Wu K, Macveigh M, Pidgeon M, Schechter J and **Hamm-Alvarez SF**. Rab3D knockout mouse lacrimal glands exhibit secretory vesicles with increased vesicle diameter and aberrant morphology. Submitted to the Association for Research in Vision and Ophthalmology 2006 Annual Meeting.

RESEARCH SEMINARS

1. Department of Neurobiology, USC, "Regulation of microtubule-dependent vesicle transport", March 6, 1996.
2. West Coast Salt and Water Club, "Kinesin activation is correlated with stimulation of secretion in lacrimal acinar cells", Morro Bay CA, March 10, 1996.
3. Department of Medicinal Chemistry and Pharmaceutics, University of Kentucky. "Regulation of microtubules, vesicle transport, and endocytosis by protein phosphatases", Oct 3, 1996.
4. Department of Biology, Centre College of Kentucky. "Regulation of microtubules, vesicle transport, and endocytosis by protein phosphatases", Oct 7, 1996.
5. Cancer Center Grand Rounds, USC Norris Cancer Center. "Regulation of microtubules and vesicle transport by protein phosphatases", Dec 17, 1996.
6. USC Center for Liver Diseases, "Regulation of microtubules and vesicle transport by microcystin in hepatocytes", Jan 25, 1997.
7. University of Michigan, Departments of Medicinal Chemistry and Pharmaceutics, "Regulation of microtubule-based vesicle transport and endocytosis by protein phosphatase 2A in hepatocytes", March 10, 1997.
8. Duke University, Department of Cell Biology, "Microtubule-dependent vesicle transport: a role in regulated secretion in the lacrimal gland", October 8, 1997.
9. University of North Carolina, Department of Pharmaceutics, "Cellular mechanisms of taxol toxicity in interphase", October 9, 1997.

10. Sixth Biennial Conference of the Membrane Biophysics Subgroup of the Biophysical Society: Advances in Membrane transport: from Molecules to Medicine, Beaufort North Carolina, "Microtubules and microtubule-based motor proteins in regulated secretion in a secretory epithelium", October 13, 1997.
11. Albert Einstein College of Medicine, Liver Center, "Regulation of cytoplasmic dynein and endocytosis in liver", January 16, 1998.
12. Megabios (San Francisco), "A novel mechanism for gene delivery to liver by regulation of the molecular motor, cytoplasmic dynein", May 4, 1998.
13. 25th International Symposium on Controlled Release of Bioactive Materials, Las Vegas Nevada, "Molecular motors and regulation of endocytosis", June 22, 1998.
14. Cancer Center Grand Rounds, USC Norris Cancer Center, "Taxol's recruitment of MAPKs to the cytoskeleton is accompanied by changes in cytoskeletal phosphorylation and dynamics", February 2, 1999.
15. American Association of Pharmaceutical Scientists annual meeting, New Orleans LA, "Molecular motors as targets for regulation of endocytosis". November 17, 1999.
16. University of Southern California Keck School of Medicine, Department of Physiology, "Kinesin function in the lacrimal gland—multiple roles for a versatile motor", Feb 11, 2000.
17. Controlled Release Society 2001 Annual Meeting, San Diego CA, Workshop on Intracellular Drug Delivery, "Cytoskeletal Control of Membrane Trafficking and Intracellular Targeting", June 23, 2001.
18. Schepens Eye Institute (Harvard University), "Cytoskeletal participation in stimulated apical secretion in lacrimal acinar epithelial cells", October 12, 2001.
19. USC/Norris Comprehensive Cancer Center. "A major role for cytoplasmic dynein in stimulated exocytosis in lacrimal acinar epithelial cells", January 15, 2002.
20. Center for Liver Diseases, Albert Einstein College of Medicine. "Cytoskeletal orchestration of stimulated exocytosis in lacrimal acinar epithelial cells", January 30, 2002.
21. Center for Liver Diseases, University of Southern California, "Cytoskeletal orchestration of stimulated exocytosis in lacrimal acinar epithelial cells", February 16, 2002.
22. Controlled Release Society 2002 Annual Meeting, Seoul Korea, "Cytoskeletal modulation of membrane trafficking in epithelial cells", July 25, 2002.
23. Toyama Pharmaceutical University, Toyama, Japan, "Molecular mechanisms of apical endocytosis in epithelial cells", July 26, 2002.
24. Controlled Release Society 2003 Winter Symposium, Salt Lake City UT "Modulation of epithelial secretory functions by adenovirus and adenovirus capsid proteins. March 4, 2003.
25. University of Iowa, Department of Pharmaceutics, "Role of actin filaments and novel effector proteins in apical clathrin-mediated endocytosis in epithelial cells", April 28, 2003.
26. University of Kalmar, Sweden, Department of Chemistry and Biochemistry, "Cytoskeletal orchestration of exocytosis and endocytosis in lacrimal acinar epithelial cells", May 25, 2003.
27. University of North Carolina, Department of Cellular and Molecular Physiology, "How cells cry: mechanisms of exocytosis in lacrimal acinar epithelial cells", November 4, 2003.

28. Emory University, Department of Physiology, “Apical actin remodeling in stimulated exocytosis of lacrimal acinar epithelial cells”, May 6, 2004.
29. West Los Angeles VA Medical Center, Pancreas Group, “How cells cry: mechanisms of apical exocytosis in lacrimal acinar epithelial cells”, June 10, 2004.
30. Advanced Medical Optics, Santa Ana CA, “The acinar cells of the lacrimal gland: physiological mechanisms of secretion and contributions to the health and integrity of the ocular surface”, July 9, 2004.
31. Research Center for Liver Disease, University of Southern California, “Actin filament remodeling in apical exocytosis in acinar epithelial cells”, October 7, 2004.
32. 4th International Conference on the Tear Film, Ocular Surface and Dry Eye Syndromes: Basic Science and Clinical Relevance, Fajardo, Puerto Rico, “The actin cytoskeleton and its effectors mediate multiple steps in secretory vesicle exocytosis in rabbit lacrimal acinar epithelial cells”, November 17, 2004.
33. USC-Japan Conference on Drug Development and Rational Drug Design, Universal City, CA “Novel adenoviral capsid protein interactions in acinar epithelial cells”, August 3, 2005.
34. 24th Biennial Cornea Research Conference, Schepens Eye Research Institute, Boston MA “Non-muscle myosin II promotes compound fusion and exocytosis of secretory vesicles in lacrimal acinar epithelial cells”, September 30, 2005.
35. Department of Pulmonary and Critical Care Medicine, USC, Los Angeles CA “Mechanisms of endocytosis in epithelial cells”, May 27, 2006.

PROFESSIONAL EDUCATION SEMINARS

1. Continuing Medical Education (CME) Course: Epithelial Cell Biology: Implications for the Ocular Surface. “Molecular mechanisms of apical secretion and retrieval in lacrimal acinar epithelia”, October 26, 2002, Doheny Eye Institute.
2. Continuing Medical Education (CME) Course: Dry Eyes. “Protein secretion in lacrimal gland”, April 9, 2005, Doheny Eye Institute.

TEACHING

Graduate Courses:

1. **Drug Transport and Delivery** (PSCI 665). Course Coordinator. Department core course offered every spring term to 10-20 graduate students and providing an introduction to principles of drug transport and delivery including controlled release, drug targeting and the delivery of biotechnology products. Areas of lecture specialization: membrane trafficking, drug targeting, antisense and gene therapy
2. **Intracellular Drug Delivery and Targeting: Mechanism and regulation of cellular membrane transport** (PSCI 667). Course coordinator. Advanced graduate seminar course providing a detailed analysis of recent literature in intracellular transport, both basic and applied sciences. Offered every other spring to 10-20 advanced graduate students.
3. **Advanced Cell Biology** (INTD 531). Survey course for 1st and 2nd year graduate students in the biomedical sciences. Offered every fall term to 60-80 graduate students from different biomedical disciplines. Areas of lecture specialization: cytoskeleton, molecular motors, membrane traffic.
4. **Pharmacokinetic and Molecular Imaging** (PSCI 599). Specialized course for advanced graduate students. Area of lecture specialization: light microscopy including confocal and multiphoton fluorescence, DIC and dark-field microscopy.
5. **Mechanisms of Cell Signaling** (MPTX 500). Survey course focused on signal transduction mechanism and techniques. Area of lecture specialization: signaling and scaffolding, imaging of signaling complexes.

Professional/Pharm D Courses:

1. **Pharmaceutics IV: Advanced Drug Delivery** 4th and final course in the Pharmaceutics core sequence covering advanced drug targeting strategies, systemic drug delivery and biologically based drugs. Offered every spring term to 160-170 Level II Pharm D students. Areas of lecture specialization: biological targeting, chemical targeting, protein and peptide drugs, antisense and gene therapies, oral drug delivery, buccal drug delivery.
2. **Basic Research Design (PH 565)** (Coordinator) An applied research elective designed to provide Pharm D students with interests in bench research with experience in laboratory techniques, data analysis, and scientific writing. Offered every fall and spring to ~5 Level III Pharm D students or Level II with instructor permission.

GRADUATE AND POSTDOCTORAL TRAINING

MS Committees:

Silvia da Costa	M. S., 1998, Department of Pharmaceutical Sciences (Chair)
Liping Zhang	M.S., 1999, Department of Pharmaceutical Sciences (Chair)
Hongtao Zheng	M.S., 2001, Department of Physiology and Biophysics
Chadron Rose	M.S., 2004, Department of Physiology and Biophysics

Chiao-yu Chen M. S. candidate, Department of Pharmaceutical Sciences (Chair)

Dissertation Committees:

Pratik Saha Ph. D., 1997, Department of Pharmaceutical Sciences
Chioma Ikonte Ph. D. 2000, Department of Pharmaceutical Sciences
Vidya Ganapathy Ph. D. 2001, Department of Pharmaceutical Sciences (Chair)
Manisha Sonee Ph. D., 2000, Department of Pharmaceutical Sciences (Chair)
Clara Magyar Ph. D., 2000, Department of Physiology and Biophysics
Cindy Xia Ph. D. 2001, Department of Pharmaceutical Sciences
Johnny Yang Ph. D. 2001, Department of Pharmaceutical Sciences
Pornchai Rojsitthisak Ph. D., 2001, Department of Pharmaceutical Sciences
Limin Qian Ph. D., 2002, Department of Physiology and Biophysics
Li Yang Ph. D., 2002, Department of Physiology and Biophysics
Silvia da Costa Ph. D., 2002, Department of Pharmaceutical Sciences (Chair)
Jiansong Xie Ph. D., 2003, Department of Physiology and Biophysics
Huynh-Hu Bui Ph. D., 2002, Department of Pharmaceutical Sciences
Chun Chu Ph. D., 2004, Department of Pharmaceutical Sciences (Chair)
Galina Jerdeva Ph. D., 2004, Department of Pharmaceutical Sciences (Chair)
Carlos Clavijo Ph. D., 2005, Department of Molecular Pharmacology and Toxicology
Jennica Zaro Ph. D., 2005, Department of Pharmaceutical Sciences
Ron Marchelletta Ph. D. candidate, Department of Pharmaceutical Sciences (Chair)
Jinoh You Ph. D. candidate, Department of Chemical Engineering
Maureen Barnes Ph. D. candidate, Department of Pharmaceutical Sciences
Rasheeda Hawk Ph. D. candidate, Department of Physiology and Biophysics
Eunbyul Sou Ph. D. candidate, Department of Pharmaceutical Sciences (Chair)
Thejani Rajapaksa Ph. D. candidate, Department of Pharmaceutical Sciences
Alexandra Schiewe Ph. D. candidate, Department of Pharmaceutical Sciences
Liyun Yuan Ph. D. candidate, Department of Pharmaceutical Sciences
Jia Ha Ph. D. candidate, Department of Biology
Elizabeth Davis Ph. D. candidate, Department of Cell and Neurobiology
Haijiang Cai Ph. D. candidate, Department of Physiology and Biophysics
Sayantan Mitra Ph. D. candidate, Department of Chemistry
Omar Khalid Ph. D. candidate, Department of Pharmaceutical Sciences (Chair)
Jo-Lin Chen Ph. D. candidate, Department of Molecular Pharmacology and Toxicology
Lilian Chiang Ph. D. candidate, Department of Pharmaceutical Sciences (Chair)
Janette Contreras Ph. D. candidate, Department of Pharmaceutical Sciences (Chair)

International students sponsored:

Jimmy Lindberg 1997, University of Kalmar, Sweden
Sofia Anderson 1999, University of Kalmar, Sweden
Sawsan Aljazrawi 2004, University of Gothenberg, Sweden
Maria Edman 2005, University of Kalmar, Sweden

Undergraduate/High School students sponsored:

Maria Rodriguez 1995 (Bravo High School)
Jana Prieto 1999, 2000 (USC Undergraduate)
Jasmin Hu 2003, 2004 (Alhambra High School/Edmondson Fellow)
Shannon Yarber 2004 (West Covina High School)
Letiticia Salas 2004 (Bravo High School/Cancer Center CURE fellow)
Afshin Arianjam 2004 (USC Undergraduate)
Alexandra Monroy 2005 (Bravo High School/Cancer Center CURE fellow)

Student Fellowship Awards:

Silvia da Costa Kirchstein-NRSA minority predoctoral fellowship 2000-2002
Fight for Sight Summer Graduate Research Fellowships in 1997 and 1999
Galina Jerdeva Fight for Sight Summer Graduate Research Fellowship, 2001
Ron Marchelletta Kirchstein-NRSA minority predoctoral fellowship, 2004-2007
Afshin Arianjam Fight for Sight Summer Undergraduate Research Fellowship, 2004

Postdoctoral fellows trained:

Patricia Vilalta 1994-1998 (currently Applications Scientist, PAGEgel, San Diego CA)
Yanru Wang 1998-2003 (currently Senior Research Associate, Department of
Physiology and Biophysics, USC)
Silvia da Costa 2003 (currently Research Scientist, Nutrilite, Buena Park CA)
LiminQian 2002-2003 (currently Research Associate, Zilkha Institute for
Neurogenetics, USC)
Jiansong Xie 2003-present
Kaijin Wu 2004-present

EXTERNAL SERVICE**Study Sections/Advisory Boards:**

1996-1997 Research Committee, American Heart Association, Greater Los Angeles Affiliate
1997-1998 Study Section, American Heart Association, California Affiliate
1998-1999 Study Section, American Heart Association, Western States Affiliate
2000 Cell Development and Function Review IRG (CDF6), NIH
2000- West Coast Salt and Water Club, Advisory Board
2001 Pharmacology Study Section (Ad hoc), NIH
2001-2003 Advisory Board, Center for Gastroenterology Research on Absorptive and
Secretory Processes (GRASP), Tufts/New England Medical Center
2001- American Heart Association Western States Affiliate study section 3B (Basic Cell
and Molecular Biology and Immunology)
2003, 2004 R03 Special Emphasis Panel (Ad hoc), NEI/NIH (ZEY1-VSN-01)
2004- External Reviewer, Action Plan for Liver Disease Research, NIDDK/NIH

- 2004 External reviewer (Ad hoc), Medical Research Council (MRC), England
- 2004- Research Committee, Western States Affiliate, American Heart Association
- 2005 PPG Special Emphasis Panel (Ad hoc), NIDDK (ZDK1 GRB-D)
- 2005- Genes and Drug Delivery Systems (GDD) Study Section, NIH

Professional Organizations:

- 1990- American Society for Cell Biology (ASCB)
- 1994- American Association for Research in Vision and Ophthalmology (ARVO)
- 1994- American Association of Pharmaceutical Scientists (AAPS)
- 1999- Controlled Release Society (CRS)
- 2000- American Physiological Society (APS)
- 2001- Tear Film and Ocular Surface Society (TFOS)

Leadership/Professional Organizations:

- 1998-2001 Co-Chair, Cellular and Molecular Therapeutics Focus Group, AAPS
- 1999 Organizer, Gene Therapy Symposium, AAPS Annual Meeting, Denver CO,
- 2001-2002 Program Chair, West Coast Salt and Water Meeting
- 2001-2005 Governing Board, Tear Film and Ocular Surface Society
- 2004-2005 Co-chair, American Heart Association Western States Affiliate study section 3B (Basic Cell and Molecular Biology and Immunology)
- 2004- Program Planning Committee (2004 Puerto Rico Meeting), Tear Film and Ocular Surface Society
- 2004- Travel Awards Committee (2004 Puerto Rico Meeting), Tear Film and Ocular Surface Society
- 2004-2005 Co-Chair, American Heart Association Western States Affiliate study section 3B (Basic Cell and Molecular Biology)
- 2005- Treasurer, Tear Film and Ocular Surface Society
- 2005- Chair, American Heart Association Western States Affiliate study section 3B (Basic Cell and Molecular Biology)

Editorial Boards:

- 2001-2005 Editorial Board, *Advanced Drug Delivery Reviews*
- 2003- Editorial Board, *Molecular Pharmaceutics*
- 2005- Executive Editor, *Advanced Drug Delivery Reviews*

Manuscript Reviews (representative journals):

- American Journal of Physiology
- Experimental Eye Research
- Investigative Ophthalmology and Visual Sciences
- Journal of Cell Biology
- Journal of Cell Science

Journal of Controlled Release
Molecular Biology of the Cell
Molecular Pharmaceutics
Molecular Therapy
Pharmaceutical Research
Traffic

UNIVERSITY SERVICE

(selected from numerous departmental, School and University committees)

1993-present Graduate Affairs Committee, Department of Pharmaceutical Sciences, USC
School of Pharmacy
1993-2000 Scholarship Standards Committee, USC School of Pharmacy
1994-1995 Faculty Search Committee, Department of Pharmaceutical Sciences
1995-2002 Graduate Fellowship Committee, USC/Norris Cancer Center
1996-2001 Executive Board, Pharmacy Faculty Assembly, USC School of Pharmacy
1996-1997 Secretary, Pharmacy Faculty Assembly, USC School of Pharmacy
1998-present Advisory Board, USC Center for Liver Diseases
1998-present Director, Confocal Microscopy Sub-Core, USC Center for Liver Diseases
1998-2000 Undergraduate Student Research, School of Pharmacy (Chair)
1998-1999 Academic Senate, USC
1999-2000 President, Pharmacy Faculty Assembly, USC School of Pharmacy
2000-2001 Faculty Search Committee, Department of Pharmaceutical Sciences (Chair)
2001-2002 Research Committee, USC
2002 Task Force on Development of New Curriculum, USC School of Pharmacy
2003-present External Programs Committee, USC School of Pharmacy
2003 Task Force, Development of Systems Biology Integrated Graduate Program, USC
2003 Centennial Committee, School of Pharmacy
2003 Faculty Search Committee, Department of Pharmaceutical Sciences (Chair)
2003 Faculty Merit Review (Dean's representative), USC School of Pharmacy
2004 Strategic Planning Group, USC School of Pharmacy (Research Area Leader)
2004-present iPIDD Graduate Committee, USC
2004-2005 Budget Advisory Committee, USC School of Pharmacy
2004-present Faculty/Chair Search Committee, Department of Pharmaceutical Sciences
2005-present University Task Force on Graduate Education, USC
2005-present Program and Activities Committee, Biomedical Imaging Sciences Initiative, USC